Mercury Emissions Inventory Development

Grant Hetherington
Wisconsin Department of Natural Resource
November 18, 2003

- Overview

  The developed 1999 mercury emissions inventory (EI) includes sources from all inventory sectors: point, area, nonroad and onroad. The spatial domain includes the lower forty-eight states, the section of Mexico north of approximately 21.7°N and the section of Canada south of the 60°N.

  - United States

    As a consequence of a survey of twenty-one air pollution state, municipal and county agencies in eighteen states surrounding Wisconsin, the 1999 National Air Toxics Assessment (NATA) EI based on the 1999 hazardous air pollutant (HAP) National Emissions Inventory (NEI) was selected as the foundation for the new mercury EI. We conducted a survey of many states during the summer of 2001. Most agencies referred us to their latest NEI submission. A few agencies responded by submitting data. Unfortunately, the submitted data was either too general or too incomplete to be helpful.

    The 1999 NATA EI based on the 1999 HAP NEI is used rather than the 1999 HAP NEI directly to take advantage of some quality assurance and data augmentation performed by EPA involving emission release point physical parameters (e.g. stack heights, stack temperatures, stack coordinates etc.), temporal profiles, and comparisons of annual and episodic emissions. Point and area source data based on the 1999 HAP NEI version 3 final was used. Since nonroad and onroad mercury emissions were completely eliminated from the 1999 HAP NEI version 3 final due a controversy concerning applied emission factors, nonroad and onroad source data based on the 1999 NEI version 3 draft were used. The mercury emissions for nonroad and onroad sources were removed from 1999 HAP NEI due to the uncertainty in the magnitude of the estimated emissions rather than any doubt that they are large enough to merit inclusion in the mercury EI. As a result, both the 1999 NEI version 3 draft and 1999 NEI version 3 final were used to develop this mercury EI. This dramatic change between the 1999 HAP NEI version 3 draft and the 1999 HAP NEI version 3 final illustrates the considerable uncertainties in even the best available mercury EIs. For Wisconsin, Illinois, Minnesota and Michigan, the NATA EI data were consolidated with the 1999 Great Lake States (GLS) EI data.

  - Mexico

    The Mexican EI is based on a 1999 EI provided by the Council for Environmental Cooperation. The Mexican EI includes only point sources. Even though 1999 area source totals were available, insufficient data was presented for spatial allocation.

  - Canada

    The Canadian EI is based on incomplete EIs for 1995 and 1999 from Environment Canada and the Ontario Ministry of the Environment respectively. 1999 Canadian data outside of Ontario was unavailable. All of data in the Canadian EI with the exception of Ontario is for 1995. For Ontario, 1995 data is used only for commercial marine emissions. The Canadian EI isn't nearly as complete or accurate as the U.S. EI described above. The relative incompleteness and imprecision of the Canadian inventory will become increasingly apparent as it is described in greater detail.

The point source EI is a voluntary EI inherently limiting the completeness and accuracy of the EI. As a consequence of confidentiality being granted to some point sources, a significant fraction of point source emissions had to be relegated to the area source sector due to the inability to locate them precisely enough to treat them as point sources. The area source EI consists of area sources and confidential point sources. The area sources near the Great Lakes were located on a 50-km grid. All other area sources were located on a 100-km grid. The nonroad EI is limited to 1995 commercial marine outside of Ontario. The onroad EI is limited to Ontario.

- Summaries

The following tables summarize mercury emissions by mercury type, source type, Standard Industrial Classification (SIC) code, Source Classification Code (SCC) and states/provinces. When summarizing emissions, any processes using SCCs not explicitly describing fuel combustion are assumed to be reporting mercury emissions not generated by fuel combustion. The mercury emissions inventory is summarized by source type and type of mercury emissions (i.e. speciated and unspeciated) in Table 1

- U.S. Point Sources

Approximately 75% of U.S. emissions are from point sources. Onroad sources contribute roughly 14%. Area and nonroad sources contribute comparable amounts approximately 6% and 5% respectively. The following tables summarize mercury emissions by mercury type, source type, Standard Industrial Classification (SIC) code, Source Classification Code (SCC) and states or provinces.

Speciated mercury was reported for U.S. point source emissions only. The U.S. speciated mercury emissions are summarized by SIC code in Table 2. Speciated mercury was reported predominantly by “electric services” or “electric and other services combined” point sources (i.e. 99.99%).

The U.S. point source mercury emissions are summarized by SIC code major group sorted from high to low annual emissions in Table 3. In this table, SIC major groups generating less than 0.1 tons are grouped together with emissions from sources with invalid SIC major groups into the “other” group. Approximately 95% of mercury emissions are contained in eight SIC code major groups with “electric, gas and sanitary services” contributing 63.5 tons (~ 58%); “metal mining” contributing 11.9 tons (~ 11%); “chemical and allied products” contributing 10.3 tons (~ 9%) and “health services” contributing 5.4 tons (~ 5%).

The U.S. point source mercury emissions are summarized by the first six digits of the SCC sorted from high to low annual emissions in Table 4. Invalid six digit partial SCCs or six digit partial SCCs with less than 0.01 tons of emissions have been grouped into “other” six digit partial SCC. Emissions at U.S. point sources are predominantly generated by coal combustion. Limiting the six digit partial SCCs to those with 0.1 tons or more of emissions annually excluding “other”, approximately 98% of all mercury emissions are captured. The top mercury emitting sources are coal combustion with 53.5 tons (~ 49%), incineration with 18.6 tons (~ 16%), gold production with 10.6 tons (~ 10%), miscellaneous industrial processes 7.2 tons (~ 7%), other fuel combustion with 4.0 tons (~ 4%), chloro-alkali production with 3.4 tons (~ 3%), other primary metal production with 3.1 tons (~3%), cement manufacturing with 1.6 tons (~ 1%) and pulp manufacturing with 1.6 tons (1%).

The U.S. point source mercury emissions are summarized by state sorted from high to low annual emissions in Table 5. The top ten states contribute 59.4 tons which is over half (~ 54%) of the U.S. point source mercury generated. The point mercury emissions

for Illinois, Michigan and Wisconsin could be slightly overstated due to potential double counting when the 1999 NATA EI was consolidated with the 1999 Great Lake States (GLS) EI.

- U.S. Onroad Sources

  The U.S. onroad source mercury emissions are summarized by the first seven digits of the SCC sorted from high to low annual emissions in Table 6. The emissions can be partitioned by fuel type. Diesel fuel emissions contribute 18.3 tons (~ 89%). Gasoline emissions contribute 2.1 tons (~ 11%).

  The U.S. onroad source mercury emissions are summarized by state sorted from high to low annual emissions in Table 7. The top ten states contribute 9.4 tons which is near half (~ 46%) of the U.S. onroad source mercury generated.

- U.S. Area Sources

  The U.S. area source mercury emissions are summarized by the first six digits or seven digits of the SCC depending on whether a point source SCC or an area source SCC is used sorted from high to low annual emissions in Table 8. Six or seven digit partial SCCs with less than 0.01 tons of emissions have been grouped into "other" six/seven digit SCC. Limiting the six and seven digit SCCs to those with 0.01 tons or more of emissions annually excluding "other", approximately 99.6% of all mercury emissions are captured. The top mercury emitting sources are general building and road construction with 2.25 tons (~ 24%), oil combustion with 1.76 tons (~ 18%), agricultural processes 1.48 tons (~ 15%), fluorescent lamp breakage with 1.00 tons (~ 10%), laboratories with 0.84 tons (~ 9), dental alloy production with 0.70 tons (~ 7%), other combustion with 0.48 tons (~ 5%), coal combustion with 0.39 tons (~ 4%), other fuel combustion with 0.28 tons (~3%), chloro-alkali production with 0.18 tons (~ 2%) and landfills with 0.09 tons (~ 1%).

  The U.S. area source mercury emissions are summarized by state sorted from high to low annual emissions in Table 9. The top ten states contribute 7.02 tons which is almost three-quarters (~ 74%) of the U.S. area source mercury generated.

- U.S. Nonroad Sources

  The U.S. nonroad source mercury emissions are summarized by the first seven digits of the SCC sorted from high to low annual emissions in Table 10. The emissions can be partitioned by fuel type or equipment type. When partitioned by equipment type, the top emitters from high to low are construction and mining equipment with 2.33 tons (~ 32%), agricultural equipment with 2.23 tons (~ 31%), railroad equipment with 0.71 tons (~10%), commercial marine vessels with 0.63 tons (~9%), industrial equipment with 0.48 tons (~7%), commercial equipment with 0.36 tons (~ 5%), lawn and garden equipment with 0.32 tons (4%) and pleasure craft (i.e. recreational marine) with 0.09 tons (~ 1%). When partitioned by fuel type, the top emitters by fuel type are diesel fuel with 6.90 tons (~ 95%) and gasoline with 0.34 tons (~ 5%).

  The U.S. nonroad source mercury emissions are summarized by state sorted from high to low annual emissions in Table 11. The top ten states contribute 3.34 tons near half (~ 46%) of the U.S. nonroad source mercury generated.

- Mexican Point Sources

  The Mexican point source mercury emissions are summarized by SIC code sorted from high to low annual emissions in Table 12 for the section of Mexico north of

approximately 21.7°N. Roughly 99% of mercury emissions are under four SIC codes: “secondary smelting and refining of nonferrous metals” contributing 9.7 tons (~ 48%); “primary smelting and refining of nonferrous metals, except copper and aluminum” contributing 8.6 tons (~ 43%); “electric services” contributing 0.8 tons (~ 4%) and “alkalies and chlorine” contributing 0.7 tons (~ 4%).

Some of the fuel combustion emissions are reported under SCCs that aren’t explicitly for fuel combustion. As a consequence, the Mexican emissions aren’t summarized by SCC since fuel combustion emissions can’t be distinguished reliably from non-fuel combustion emissions.

The Mexican point source mercury emissions are summarized by state sorted from high to low annual emissions in Table 13 for the section of Mexico north of approximately 21.7°N. The top six states contribute 19.12 tons which is 95.1% of the Mexican point source mercury generated. Point sources in the states bordering the U.S. emit 7.32 tons (~ 36.5%). The locations of the point sources are plotted in Figure 1.

- Canadian Non-Confidential Point Sources

  A significant number of Canadian point sources have been granted confidential status relegating their emissions to the area source sector. All of the 1999 data are for non-confidential Ontario point sources. The remaining provinces have 1995 non-confidential point source data.

  The Canadian non-confidential point source mercury emissions are summarized by the first six digits of the SCC sorted from high to low annual emissions in Table 14. Invalid six digit partial SCCs or six digit partial SCCs with less than 0.001 tons of emissions have been grouped into “other” six digit SCC. Emissions at these sources are predominantly generated by primary metal production. Limiting the six digit partial SCCs to those with 0.01 tons or more of emissions annually excluding “other”, approximately 99% of all mercury emissions are captured. The top mercury emitting sources are primary metal production with 3.92 tons (~ 56%), incineration with 1.37 tons (~ 20%), fuel combustion excluding coal with 0.69 tons (~ 10%), coal combustion with 0.67 tons (~ 9%) and pulp manufacturing with 0.09 tons (1%).

  The Canadian non-confidential point source mercury emissions are summarized by province sorted from high to low annual emissions in Table 15. The western provinces (i.e. Manitoba westward) contribute 5.03 tons nearly three-quarters (~ 72%) of the Canadian non-confidential point source mercury generated.

- Canadian Area and Confidential Point Sources

  Canadian confidential point source data were consolidated with Canadian area source data. This consolidation occurred before the Wisconsin DNR received the data. All of the 1999 data is for Ontario sources. The remaining provinces have 1995 data.

  The Canadian area and confidential point source mercury emissions are summarized by the first seven digits of the SCC sorted from high to low annual emissions in Table 16. Emissions at these sources are predominantly generated by primary metal production. The top mercury emitting sources are primary metal production with 0.89 tons (~ 50%), mineral production with 0.27 tons (~ 16%), pesticide application with 0.16 tons (~ 9%), fuel combustion excluding coal with 0.12 tons (~ 6%), wood products production with 0.10 tons (~ 6%), mining and quarrying with 0.08 (~ 4%),

coal combustion with 0.06 tons (~ 3%), incineration with 0.04 tons (~ 2%), oil and gas production with 0.04 (~2%) and chemical manufacturing with 0.01 tons (1%).

The Canadian area and confidential point source mercury emissions are summarized by province sorted from high to low annual emissions in Table 17. Quebec contributes 1.34 tons over half (~ 57%) of the Canadian area and confidential point source mercury generated.

- Canadian Nonroad Sources

  The Canadian nonroad source mercury emissions are summarized by SCC sorted from high to low annual emissions in Table 18. The nonroad emissions are summarized by province sorted from high to low in Table 19. Any discussion of the summaries is omitted due to geographic incompleteness of the data. Emissions data for categories other than commercial marine were only available in Ontario. For Ontario, sixteen nonroad source categories were used including the 1995 commercial marine data.

- Canadian Onroad Sources

  The Canadian onroad source mercury emissions are summarized by SCC sorted from high to low annual emissions in Table 20. The onroad emissions represent only Ontario. The emissions can be partitioned by fuel type. Diesel fuel emissions contribute 0.13 tons (~ 81%). Gasoline emissions contribute 0.03 tons (~ 19%).

- Great Lake States (GLS) EI Consolidation

  The GLS EI data was consolidated with the 1999 NATA EI data for Wisconsin, Minnesota, Illinois and Michigan.

  - Wisconsin

    The point source 1999 NATA EI was consolidated with the 1999 GLS EI using federal facility ids, site ids, NTI site ids, site names, site addresses, site cities, site zipcodes and SIC codes. GLS EI data took precedence over NATA EI data. Any sources that appeared in only one of the two EIs were kept. Additional improvements made to the point source emissions are listed below.

    1. Identified ninety-three stationary combustion sources that did not report mercury to the emissions inventory. The emissions from these sources were estimated using EPA's Factor Information Retrieval data system (FIRE) version 6.23 emission factors. These emissions were incorporated into the EI as area sources.
    2. Corrected mercury emissions for twelve paper facilities. Reported mercury emissions were corrected based on the Mercury Advisory Group emission estimates for industrial boilers. The revised estimates resulted in equal or lower emissions from those reported.

    The area source 1999 NATA EI was consolidated with the 1999 GLS EI. GLS EI data took precedence over NATA EI data. Any source categories that appeared in only one of the two EIs were kept. Data replacements for a source category were done statewide not county by county. When consolidating the two EIs, SCCs were examined to assure that emissions reported in one EI weren't being reported in the other EI using another more general or specific SCC to prevent double counting. The GLS data introduced or replaced emissions for the categories listed by SCC in Table 21. Statewide mercury emissions from forest fires were estimated to be

approximately nine pounds. However, these emissions weren't incorporated into the EI due to the absence of a reasonable method for spatial allocation and their relatively small magnitude.

The nonroad source 1999 NATA EI provides the nonroad emissions for all categories.

The onroad source data in the 1999 NATA EI, which was generated by the MOBILE6 program, is used. The onroad source data in the 1999 GLS EI was generated using the MOBILE5 program.

- Minnesota

  The point source 1999 NATA EI was improved using recommendations from the Minnesota Pollution Control Agency. In this case, the point source 1999 NATA EI for Minnesota was double counting mercury emissions for some of the processes at eleven electric utilities. These duplicate emissions were deleted.

  The area source 1999 NATA EI was consolidated with the 1999 GLS EI. GLS EI data took precedence over NATA EI data. Any sources that appeared in only one of the two EIs were kept. Data replacements for a source category were done statewide not county by county. When consolidating the two EIs, Source Classification Codes (SCCs) were compared to assure that emissions reported in one EI weren't being reported in the other EI using another more general or specific SCC to prevent double counting. The GLS data introduced or replaced emissions for the categories listed by SCC in Table 22.

  The nonroad source1999 NATA EI provides the nonroad emissions for all categories with the exception of aircraft, locomotive and commercial marine. Emissions for these categories are from the 1999 GLS EI.

  The onroad source data in the 1999 NATA EI, which was generated by the MOBILE6 program, is used. The onroad source data in the 1999 GLS EI was generated using the MOBILE5 program.

- Illinois and Michigan

  The point source 1999 NATA EI was consolidated with the Great Lake States (GLS) EI using federal facility ids, site ids, NTI site ids, site names, site addresses, site cities, site zipcodes and SIC codes. GLS EI data took precedence over NATA EI data. Any sources that appeared in only one of the two EIs were kept.

  The area source 1999 NATA EI was consolidated with the Great Lake States (GLS) EI. GLS EI data took precedence over NATA EI data. Any sources that appeared in only one of the two EIs were kept. Data replacements for a source category were done statewide not county by county. When consolidating the two EIs, Source Classification Codes (SCCs) were compared to assure that emissions reported in one EI weren't being reported in the other EI using another more general or specific SCC to prevent double counting. The GLS data introduced or replaced emissions for the categories listed by SCC for Illinois and Michigan in Tables 23 and 24 respectively. For Michigan, the SCC of "2810060100" isn't defined in the current EPA SCC database even though it appears in both the NATA and the GLS EIs.

  The nonroad source1999 NATA EI provides the nonroad emissions for all categories

  The onroad source data in the 1999 NATA EI, which was generated by the MOBILE6 program, is used. The onroad source data in the 1999 GLS EI was generated using the MOBILE5 program.

- QA/QC and Processing

  - U.S. Point Sources

    All the U.S. data was formatted into National Emissions Inventory Input Format 2.0 (NIF 2.0). The procedures used to QA/QC the data are described below.

    1. Reviewed data for duplicate and missing NIF records. Deleted any duplicates and added any missing NIF records keeping the most complete and sensible data.
    2. Assigned speciation profiles to all mercury related SCCs and created default profiles for processes using SCCs not normally associated with mercury. The profiles were selected after a review of the available speciation data.
    3. Reviewed data for correct or missing SCCs. If sufficient information was available, SCCs were changed. Correct SCCs are critical for assigning defaults parameters (e.g. stack height) and speciation profiles for emissions modeling. Also, a SCC can indicate whether a process is inappropriately reporting mercury emissions (e.g. dry cleaning processes).
    4. Reviewed data for emissions outliers further than three standards deviations from the mean by the type of mercury reported. See Table 25 for the different types of mercury and mercury compounds that could be reported. If sufficient information was available, emissions were adjusted or removed.
    5. Reviewed data for emissions outliers further than three standards deviations from the mean by SCC and the first six digits of the SCC. If SCCs weren't used and process descriptions were available, process descriptions were used. If sufficient information was available, emissions were adjusted or removed.
    6. Reviewed processes with reported throughputs. If these processes had reported emission factors or emission factors associated with a given SCC, compared reported mercury emissions with calculated emissions.
    7. Reviewed process level emissions to determine if the reported types of mercury were redundant. For instance, a process shouldn't be used to report both speciated and unspeciated mercury. See Table 26 for results.
    8. Reviewed total capture control efficiencies. If sufficient information was available or the reported value was greater than or equal to 100%, values were adjusted or removed.
    9. Used Emissions Modeling System (EMS2003) reports to review stack parameters, SCCs, SIC codes, latitude and longitude coordinates; process temporal parameters; and search for duplicate or missing emission release records.

  - U.S. Area Sources

    1. Reviewed data for duplicate and missing NIF records. Deleted any duplicates and added any missing NIF records keeping the most complete and sensible data.
    2. Assigned speciation profiles to all mercury related SCCs and created default profiles for processes using SCCs not normally associated with mercury. The profiles were selected after a review of the available speciation data.
    3. Reviewed data for correct or missing SCCs. Correct SCCs are critical for assigning default speciation profiles for emissions modeling.

  - U.S. Nonroad Sources

    1. Reviewed data for duplicate and missing NIF records. Deleted any duplicates and added any missing NIF records keeping the most complete and sensible data.
    2. Assigned speciation profiles to all mercury related SCCs and created default profiles for processes using SCCs not normally associated with mercury. The profiles were selected after a review of the available speciation data.

3. Reviewed data for correct or missing SCCs. Correct SCCs are critical for assigning default speciation profiles for emissions modeling. Eight initially unrecognized commercial marine and railroads SCCs were found (i.e. 2280002100, 2280002200, 2280003100, 2280003200, 2285002006, 2285002007, 2285002008 and 2285002009) that will be incorporated into a new SCC list.

- U.S. Onroad Sources

1. Reviewed data for duplicate and missing NIF records. Deleted any duplicates and added any missing NIF records keeping the most complete and sensible data.
2. Assigned speciation profiles to all mercury related SCCs and created default profiles for processes using SCCs not normally associated with mercury. The profiles were selected after a review of the available speciation data.
3. Reviewed data for correct or missing SCCs.

- Canadian Non-Confidential Point Sources

1. Reviewed latitude and longitude coordinates that coincide with county centroids. Two sources were dropped because of missing location data. Sources north of 60°N were dropped.
2. Reviewed data for the most current available year. Data from 1995 and 1999 were used.
3. Removed any outdated emissions.
4. Reviewed data for records with same locations. Deleted records when emissions were redundant.
5. Reviewed data for correct or missing SCCs.
6. Restructured data into a format that could be converted into NIF by EMS2003.

- Canadian Confidential Point, Area and Nonroad Sources

1. Reviewed latitude and longitude coordinates that coincide with county centroids. Emissions north of 60°N were dropped.
2. Located emissions in appropriate provinces.
3. Reviewed data for the most current available year. Data from 1995 and 1999 were used.
4. Removed any outdated emissions.
5. Reviewed data for correct or missing SCCs. Added SCCs based on provided process descriptions.
6. Reviewed area and nonroad data for records with same locations and same type of process. Deleted records when emissions were redundant.
7. Restructured data into a format that could be converted into NIF by EMS2003.

- Canadian Onroad Sources

1. Reviewed latitude and longitude coordinates that coincide with county centroids. Emissions north of 60°N were dropped.
2. Reviewed data for correct or missing SCCs.
3. Reviewed data for records with same locations and same type of process. Deleted records when emissions were redundant.
4. Restructured data into a format that could be converted into NIF by EMS2003.

- Mexican Point Sources

1. Reviewed descriptions of point source groups. See Table 27.
2. Located emissions in appropriate states.

3. Assigned SIC codes based on descriptions of emission sources.
4. Assigned SCCs based on descriptions of emission sources.
5. Restructured data into a format that could be converted into NIF by EMS2003.

Table 1: Speciated and Unspeciated Annual Mercury Emissions by Source Type (tons)

Source type	Speciated mercury	Unspeciated mercury	Totals
U.S. – point	43.78	65.96	109.74
U.S. – onroad	0	20.36	20.36
U.S. – area	0	9.54	9.54
U.S. – nonroad	0	7.28	7.28
Subtotals	43.78	103.14	146.92
Mexico – point	0	20.07	20.07
Canada – non-confidential point	0	7.00	7.00
Canada – confidential point and area	0	2.34	2.34
Canada – nonroad	0	0.25	0.25
Canada – onroad	0	0.16	0.16
Subtotals	0	9.75	9.75
Grand totals	43.78	132.96	176.74

Table 2: U.S. Speciated Point Source Annual Mercury Emissions by Standard Industrial Classification (SIC) Code (tons)

SIC code	SIC code description	Emissions
4911	Electric Services	36.423
4931	Electric and Other Services Combined	7.356
9711	National Security	0.003
	Total	43.782

Table 3: U.S. Point Source Annual Mercury Emissions by SIC Major Group Code (tons)

SIC major group	SIC major group description	Emissions
49	Electric, gas and sanitary services	63.45
10	Metal mining	11.92
28	Chemicals and allied products	10.28
80	Health services	5.35
32	Stone, clay, glass, and concrete products	4.40
33	Primary metal industries	3.51

26	Paper and allied products	2.78
29	Petroleum refining and related industries	2.08
20	Food and kindred products	0.73
97	National security and international affairs	0.63
91	Executive, legislative, and general government, except finance	0.52
13	Oil and gas extraction	0.27
24	Lumber and wood products, except furniture	0.27
82	Educational services	0.24
72	Personal services	0.19
37	Transportation equipment	0.16
30	Rubber and miscellaneous plastic products	0.15
35	Industrial and commercial machinery and computer equipment	0.14
36	Electronic and other electrical equipment and components, except computer equipment	0.12
Other		2.55

Table 4: U.S. Point Source Annual Mercury Emissions by the First Six Digits of the SCC (tons)

6 digit partial SCC	1st digit SCC description	2nd and 3rd digits SCC description	4th, 5th and 6th digits SCC description	Emissions
101002	External Combustion Boilers	Electric Generation	Bituminous/Subbituminous Coal	47.194
303013	Industrial Processes	Primary Metal Production	Gold	10.593
399999	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Industrial Processes	7.227
503005	Waste Disposal	Solid Waste Disposal - Industrial	Incineration	6.668
501001	Waste Disposal	Solid Waste Disposal - Government	Municipal Incineration	5.742
101003	External Combustion Boilers	Electric Generation	Lignite	4.422
502005	Waste Disposal	Solid Waste Disposal - Commercial/Institutional	Incineration: Special Purpose	3.793
301008	Industrial Processes	Chemical Manufacturing	Chloro-alkali Production	3.406
303009	Industrial Processes	Primary Metal Production	Steel Manufacturing (See 3-03-015 for Integrated Iron & Steel MACT)	2.119
102002	External Combustion Boilers	Industrial	Bituminous/Subbituminous Coal	1.721
502001	Waste Disposal	Solid Waste Disposal - Commercial/Institutional	Incineration	1.663
307001	Industrial Processes	Pulp and Paper and Wood Products	Sulfate (Kraft) Pulping	1.637
305006	Industrial Processes	Mineral Products	Cement Manufacturing (Dry Process)	1.482
306002	Industrial Processes	Petroleum Industry	Catalytic Cracking Units	1.115
201010	Internal Combustion Engines	Electric Generation	Geysers/Geothermal	1.035
101012	External Combustion Boilers	Electric Generation	Solid Waste	0.715
303002	Industrial Processes	Primary Metal Production	Aluminum Hydroxide Calcining	0.678
501005	Waste Disposal	Solid Waste Disposal - Government	Other Incineration	0.526
102009	External Combustion Boilers	Industrial	Wood/Bark Waste	0.513
304003	Industrial Processes	Secondary Metal Production	Grey Iron Foundries	0.502

504002	Waste Disposal	Site Remediation		0.473
301112	Industrial Processes	Chemical Manufacturing	Elemental Phosphorous	0.458
101004	External Combustion Boilers	Electric Generation	Residual Oil	0.447
202002	Internal Combustion Engines	Industrial	Natural Gas	0.446
305014	Industrial Processes	Mineral Products	Glass Manufacture	0.427
390012	Industrial Processes	In-process Fuel Use	Solid Waste	0.374
310004	Industrial Processes	Oil and Gas Production	Process Heaters	0.311
306001	Industrial Processes	Petroleum Industry	Process Heaters	0.286
503001	Waste Disposal	Solid Waste Disposal - Industrial	Incineration	0.221
201002	Internal Combustion Engines	Electric Generation	Natural Gas	0.192
102004	External Combustion Boilers	Industrial	Residual Oil	0.181
303003	Industrial Processes	Primary Metal Production	By-product Coke Manufacturing	0.169
101006	External Combustion Boilers	Electric Generation	Natural Gas	0.149
102006	External Combustion Boilers	Industrial	Natural Gas	0.148
390006	Industrial Processes	In-process Fuel Use	Natural Gas	0.146
102007	External Combustion Boilers	Industrial	Process Gas	0.141
305007	Industrial Processes	Mineral Products	Cement Manufacturing (Wet Process)	0.134
103002	External Combustion Boilers	Commercial/Institutional	Bituminous/Subbituminous Coal	0.129
502006	Waste Disposal	Solid Waste Disposal - Commercial/Institutional	Landfill Dump	0.127
305016	Industrial Processes	Mineral Products	Lime Manufacture	0.126
303008	Industrial Processes	Primary Metal Production	Iron Production (See 3-03-015 for Integrated Iron & Steel MACT)	0.104
305002	Industrial Processes	Mineral Products	Asphalt Concrete	0.102
301005	Industrial Processes	Chemical Manufacturing	Carbon Black Production	0.082
304004	Industrial Processes	Secondary Metal Production	Lead	0.081
101005	External Combustion Boilers	Electric Generation	Distillate Oil	0.076
307999	Industrial Processes	Pulp and Paper and Wood Products	Other Not Classified	0.074
304001	Industrial Processes	Secondary Metal Production	Aluminum	0.074
385001	Industrial Processes	Cooling Tower	Process Cooling	0.070
101008	External Combustion Boilers	Electric Generation	Coke	0.065
303030	Industrial Processes	Primary Metal Production	Zinc Production	0.060
305040	Industrial Processes	Mineral Products	Mining and Quarrying of Nonmetallic Minerals	0.058
101001	External Combustion Boilers	Electric Generation	Anthracite Coal	0.050
305101	Industrial Processes	Mineral Products	Bulk Materials Conveyors	0.048
103006	External Combustion Boilers	Commercial/Institutional	Natural Gas	0.048
101009	External Combustion Boilers	Electric Generation	Wood/Bark Waste	0.043
103005	External Combustion Boilers	Commercial/Institutional	Distillate Oil	0.042
390008	Industrial Processes	In-process Fuel Use	Coke	0.042
390002	Industrial Processes	In-process Fuel Use	Bituminous Coal	0.042
202001	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	0.041
309011	Industrial Processes	Fabricated Metal Products	Conversion Coating of Metal Products	0.036
304007	Industrial Processes	Secondary Metal Production	Steel Foundries	0.031
102005	External Combustion Boilers	Industrial	Distillate Oil	0.030
501004	Waste Disposal	Solid Waste Disposal - Government	Landfill Dump	0.022

305100	Industrial Processes	Mineral Products	Bulk Materials Elevators	0.022
305003	Industrial Processes	Mineral Products	Brick Manufacture	0.021
102012	External Combustion Boilers	Industrial	Solid Waste	0.021
201001	Internal Combustion Engines	Electric Generation	Distillate Oil (Diesel)	0.020
305001	Industrial Processes	Mineral Products	Asphalt Roofing Manufacture	0.019
302016	Industrial Processes	Food and Agriculture	Sugar Beet Processing	0.018
402001	Petroleum and Solvent Evaporation	Surface Coating Operations	Surface Coating Application - General	0.017
301018	Industrial Processes	Chemical Manufacturing	Plastics Production	0.015
102001	External Combustion Boilers	Industrial	Anthracite Coal	0.015
315021	Industrial Processes	Photographic Equipment/Health Care/Laboratories	Health Care - Crematoriums	0.013
307004	Industrial Processes	Pulp and Paper and Wood Products	Pulpboard Manufacture	0.013
302006	Industrial Processes	Food and Agriculture	Feed and Grain Country Elevators	0.012
102013	External Combustion Boilers	Industrial	Liquid Waste	0.011
490999	Petroleum and Solvent Evaporation	Organic Solvent Evaporation	Miscellaneous Volatile Organic Compound Evaporation	0.011
301999	Industrial Processes	Chemical Manufacturing	Other Not Classified	0.011
490001	Petroleum and Solvent Evaporation	Organic Solvent Evaporation	Solvent Extraction Process	0.010
other				0.333

Table 5: U.S. Point Source Annual Mercury Emissions by State (tons)

State	Emissions	State	Emissions
Nevada	11.54	Oklahoma	1.19
Texas	8.08	Kansas	1.18
Illinois	8.04	New Mexico	1.14
Pennsylvania	7.60	Utah	1.06
Ohio	4.91	Wyoming	1.05
California	4.51	Iowa	1.03
Indiana	4.29	Arkansas	1.01
Alabama	3.66	New Jersey	0.95
Kentucky	3.51	Mississippi	0.94
Michigan	3.25	Arizona	0.86
Maryland	3.22	Washington	0.79
West Virginia	3.19	Idaho	0.75
Florida	3.14	Delaware	0.70
North Carolina	2.81	Massachusetts	0.69
Georgia	2.67	Montana	0.55
Wisconsin	2.59	Colorado	0.49
Oregon	2.50	Nebraska	0.49
Louisiana	2.31	Connecticut	0.29
Tennessee	2.21	Maine	0.18
Minnesota	2.01	New Hampshire	0.18
New York	1.90	Rhode Island	0.14

Missouri	1.77	South Dakota	0.06
South Carolina	1.58	District of Columbia	0.00
Virginia	1.46	Vermont	0.00
North Dakota	1.27		

Table 6: U.S. Onroad Source Annual Mercury Emissions by the First Seven Digits of the SCC (tons)

7 digit partial SCC	1st and 2nd digits SCC description	3rd and 4th digits SCC description	5th, 6th and 7th digits SCC description	Emissions
2230074	Mobile Sources	Highway Vehicles - Diesel	Heavy Duty Diesel Vehicles (HDDV) Class 8A & 8B	11.314
2230073	Mobile Sources	Highway Vehicles - Diesel	Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7	3.112
2230071	Mobile Sources	Highway Vehicles - Diesel	Heavy Duty Diesel Vehicles (HDDV) Class 2B	1.842
2201001	Mobile Sources	Highway Vehicles - Gasoline	Light Duty Gasoline Vehicles (LDGV)	1.337
2230072	Mobile Sources	Highway Vehicles - Diesel	Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5	1.314
2201020	Mobile Sources	Highway Vehicles - Gasoline	Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5)	0.503
2230075	Mobile Sources	Highway Vehicles - Diesel	Heavy Duty Diesel Buses (School & Transit)	0.499
2230070	Mobile Sources	Highway Vehicles - Diesel	All HDDV including Buses (use subdivisions -071 thru -075 if possible)	0.168
2201040	Mobile Sources	Highway Vehicles - Gasoline	Light Duty Gasoline Trucks 3 & 4 (M6) = LDGT2 (M5)	0.168
2201070	Mobile Sources	Highway Vehicles - Gasoline	Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)	0.057
2230001	Mobile Sources	Highway Vehicles - Diesel	Light Duty Diesel Vehicles (LDDV)	0.030
2230060	Mobile Sources	Highway Vehicles - Diesel	Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)	0.017
2201080	Mobile Sources	Highway Vehicles - Gasoline	Motorcycles (MC)	0.003

Table 7: U.S. Onroad Source Annual Mercury Emissions by State (tons)

State	Emissions	State	Emissions
Texas	1.703	Louisiana	0.381
Florida	1.093	Oregon	0.317
New York	0.992	Colorado	0.310
Pennsylvania	0.887	Arkansas	0.285
Ohio	0.886	Iowa	0.283
Georgia	0.851	Kansas	0.251
Illinois	0.811	Connecticut	0.228
Michigan	0.800	New Mexico	0.216
North Carolina	0.785	West Virginia	0.193
Indiana	0.633	California	0.177
Virginia	0.632	Nebraska	0.172
Missouri	0.581	Utah	0.168
Tennessee	0.563	Nevada	0.142
Wisconsin	0.523	Idaho	0.136
New Jersey	0.481	New Hampshire	0.113
Minnesota	0.457	Montana	0.102

Kentucky	0.448	Maine	0.091
South Carolina	0.427	South Dakota	0.085
Alabama	0.426	Wyoming	0.080
Washington	0.422	North Dakota	0.074
Mississippi	0.394	Delaware	0.073
Maryland	0.392	Vermont	0.068
Arizona	0.385	Rhode Island	0.058
Oklahoma	0.382	District of Columbia	0.022
Massachusetts	0.381		

Table 8: U.S. Area Source Annual Mercury Emissions by the First Six or Seven Digits of the SCC (tons)

6 or 7 digit partial SCC	1st digit SCC description or 1st and 2nd digits SCC description	2nd and 3rd digit SCC description or 3rd and 4th digits SCC description	4th, 5th and 6th digit SCC description or 5th, 6th and 7th digits SCC description	Emissions
2801000	Miscellaneous Area Sources	Agriculture Production - Crops	Agriculture - Crops	1.282
2311010	Industrial Processes	Construction: SIC 15 - 17	General Building Construction	1.278
2104004	Stationary Source Fuel Combustion	Residential	Distillate Oil	1.154
2861000	Miscellaneous Area Sources	Fluorescent Lamp Breakage	Total	0.997
2311030	Industrial Processes	Construction: SIC 15 - 17	Road Construction	0.971
315030	Industrial Processes	Photographic Equipment/Health Care/Laboratories	Laboratories	0.836
315025	Industrial Processes	Photographic Equipment/Health Care/Laboratories	Dental Alloy (Mercury Amalgams) Production	0.696
2103004	Stationary Source Fuel Combustion	Commercial/Institutional	Distillate Oil	0.467
2810060	Miscellaneous Area Sources	Other Combustion		0.267
2104002	Stationary Source Fuel Combustion	Residential	Bituminous/Subbituminous Coal	0.209
301008	Industrial Processes	Chemical Manufacturing	Chloro-alkali Production	0.179
2810015	Miscellaneous Area Sources	Other Combustion	Prescribed Burning for Forest Management	0.162
2103002	Stationary Source Fuel Combustion	Commercial/Institutional	Bituminous/Subbituminous Coal	0.116
102013	External Combustion Boilers	Industrial	Liquid Waste	0.115
2801500	Miscellaneous Area Sources	Agriculture Production - Crops	Agricultural Field Burning - whole field set on fire	0.107
2104006	Stationary Source Fuel Combustion	Residential	Natural Gas	0.096
2620030	Waste Disposal, Treatment, and Recovery	Landfills	Municipal	0.088
2805000	Miscellaneous Area Sources	Agriculture Production - Livestock	Agriculture - Livestock	0.086
2102005	Stationary Source Fuel Combustion	Industrial	Residual Oil	0.063
2102004	Stationary Source Fuel Combustion	Industrial	Distillate Oil	0.057
2810001	Miscellaneous Area Sources	Other Combustion	Forest Wildfires	0.048
102005	External Combustion Boilers	Industrial	Distillate Oil	0.048
2102006	Stationary Source Fuel Combustion	Industrial	Natural Gas	0.046
2103005	Stationary Source Fuel Combustion	Commercial/Institutional	Residual Oil	0.031

2610000	Waste Disposal, Treatment, and Recovery	Open Burning	All Categories	0.026
2104001	Stationary Source Fuel Combustion	Residential	Anthracite Coal	0.024
2102002	Stationary Source Fuel Combustion	Industrial	Bituminous/Subbituminous Coal	0.015
2103001	Stationary Source Fuel Combustion	Commercial/Institutional	Anthracite Coal	0.014
2103006	Stationary Source Fuel Combustion	Commercial/Institutional	Natural Gas	0.014
2103008	Stationary Source Fuel Combustion	Commercial/Institutional	Wood	0.011
other				0.041

Table 9: U.S. Area Source Annual Mercury Emissions by State (tons)

State	Emissions	State	Emissions
California	4.154	Alabama	0.063
New York	0.652	South Carolina	0.061
Illinois	0.358	Arizona	0.060
Pennsylvania	0.316	Kentucky	0.057
New Jersey	0.287	Iowa	0.052
Florida	0.277	Colorado	0.048
Maine	0.273	Louisiana	0.047
Texas	0.240	Oklahoma	0.043
Massachusetts	0.235	Rhode Island	0.039
Oregon	0.232	Kansas	0.037
Minnesota	0.186	Arkansas	0.034
Ohio	0.170	Mississippi	0.030
Connecticut	0.152	Utah	0.029
Michigan	0.149	West Virginia	0.028
Georgia	0.137	Vermont	0.026
Wisconsin	0.129	Nevada	0.025
Virginia	0.127	New Mexico	0.022
North Carolina	0.116	Nebraska	0.021
Maryland	0.105	North Dakota	0.016
Indiana	0.086	Delaware	0.015
Idaho	0.084	Montana	0.013
New Hampshire	0.076	South Dakota	0.013
Missouri	0.074	Wyoming	0.008
Tennessee	0.071	District of Columbia	0.004
Washington	0.066		

Table 10: U.S. Nonroad Source Annual Mercury Emissions by First Seven Digits of the SCC (tons)

7 digit partial SCC	1st and 2nd digits SCC description	3rd and 4th digits SCC description	5th, 6th and 7th digits SCC description	Emissions
2270002	Mobile Sources	Off-highway Vehicle Diesel	Construction and Mining Equipment	2.315

2270005	Mobile Sources	Off-highway Vehicle Diesel	Agricultural Equipment	2.227
2285002	Mobile Sources	Railroad Equipment	Diesel	0.708
2280002	Mobile Sources	Marine Vessels, Commercial	Diesel	0.589
2270003	Mobile Sources	Off-highway Vehicle Diesel	Industrial Equipment	0.418
2270006	Mobile Sources	Off-highway Vehicle Diesel	Commercial Equipment	0.313
2270004	Mobile Sources	Off-highway Vehicle Diesel	Lawn and Garden Equipment	0.165
2265004	Mobile Sources	Off-highway Vehicle Gasoline, 4-Stroke	Lawn and Garden Equipment	0.120
2270007	Mobile Sources	Off-highway Vehicle Diesel	Logging Equipment	0.064
2282005	Mobile Sources	Pleasure Craft	Gasoline 2-Stroke	0.062
2265006	Mobile Sources	Off-highway Vehicle Gasoline, 4-Stroke	Commercial Equipment	0.041
2280003	Mobile Sources	Marine Vessels, Commercial	Residual	0.037
2260004	Mobile Sources	Off-highway Vehicle Gasoline, 2-Stroke	Lawn and Garden Equipment	0.031
2265003	Mobile Sources	Off-highway Vehicle Gasoline, 4-Stroke	Industrial Equipment	0.031
2270010	Mobile Sources	Off-highway Vehicle Diesel	Industrial Equipment	0.031
2270008	Mobile Sources	Off-highway Vehicle Diesel	Airport Ground Support Equipment	0.026
2282020	Mobile Sources	Pleasure Craft	Diesel	0.018
2270009	Mobile Sources	Off-highway Vehicle Diesel	Underground Mining Equipment	0.015
2265001	Mobile Sources	Off-highway Vehicle Gasoline, 4-Stroke	Recreational Equipment	0.013
2270001	Mobile Sources	Off-highway Vehicle Diesel	Recreational Equipment	0.012
2260001	Mobile Sources	Off-highway Vehicle Gasoline, 2-Stroke	Recreational Equipment	0.012
2282010	Mobile Sources	Pleasure Craft	Gasoline 4-Stroke	0.010
2265002	Mobile Sources	Off-highway Vehicle Gasoline, 4-Stroke	Construction and Mining Equipment	0.007
2260002	Mobile Sources	Off-highway Vehicle Gasoline, 2-Stroke	Construction and Mining Equipment	0.004
2265005	Mobile Sources	Off-highway Vehicle Gasoline, 4-Stroke	Agricultural Equipment	0.003
2260006	Mobile Sources	Off-highway Vehicle Gasoline, 2-Stroke	Commercial Equipment	0.002
2260007	Mobile Sources	Off-highway Vehicle Gasoline, 2-Stroke	Logging Equipment	0.001
2265010	Mobile Sources	Off-highway Vehicle Gasoline, 4-Stroke	Industrial Equipment	0.001
2267003	Mobile Sources	LPG	Industrial Equipment	0.001
2282000	Mobile Sources	Pleasure Craft	All Fuels	0.001
2265007	Mobile Sources	Off-highway Vehicle Gasoline, 4-Stroke	Logging Equipment	0.000
2280000	Mobile Sources	Marine Vessels, Commercial	All Fuels	0.000
2268010	Mobile Sources	CNG	Industrial Equipment	0.000
2265008	Mobile Sources	Off-highway Vehicle Gasoline, 4-Stroke	Airport Ground Support Equipment	0.000
2260005	Mobile Sources	Off-highway Vehicle Gasoline, 2-Stroke	Agricultural Equipment	0.000
2285004	Mobile Sources	Railroad Equipment	Gasoline, 4-Stroke	0.000
2268003	Mobile Sources	CNG	Industrial Equipment	0.000
2268006	Mobile Sources	CNG	Commercial Equipment	0.000
2267006	Mobile Sources	LPG	Commercial Equipment	0.000
2260003	Mobile Sources	Off-highway Vehicle Gasoline, 2-Stroke	Industrial Equipment	0.000
2267002	Mobile Sources	LPG	Construction and Mining Equipment	0.000
2267004	Mobile Sources	LPG	Lawn and Garden Equipment	0.000
2268005	Mobile Sources	CNG	Agricultural Equipment	0.000
2267008	Mobile Sources	LPG	Airport Ground Support Equipment	0.000
2267001	Mobile Sources	LPG	Recreational Equipment	0.000

2267005	Mobile Sources	LPG	Agricultural Equipment	0.000
2268002	Mobile Sources	CNG	Construction and Mining Equipment	0.000
2285006	Mobile Sources	Railroad Equipment	LPG	0.000

Table 11: U.S. Nonroad Source Annual Mercury Emissions by State (tons)

State	Emissions	State	Emissions
California	0.884	Arkansas	0.115
Texas	0.428	South Dakota	0.114
Illinois	0.356	Colorado	0.112
Ohio	0.280	New Jersey	0.107
Florida	0.262	Montana	0.105
New York	0.261	Mississippi	0.100
Iowa	0.233	Alabama	0.095
Minnesota	0.223	Oregon	0.093
Louisiana	0.214	Arizona	0.092
Kansas	0.205	Utah	0.084
Indiana	0.204	Maryland	0.077
Missouri	0.199	South Carolina	0.074
Pennsylvania	0.193	Idaho	0.056
Michigan	0.188	Nevada	0.051
Nebraska	0.182	New Mexico	0.049
North Dakota	0.168	West Virginia	0.047
Georgia	0.155	Connecticut	0.044
North Carolina	0.152	Wyoming	0.040
Washington	0.148	Maine	0.025
Wisconsin	0.147	Delaware	0.019
Massachusetts	0.143	New Hampshire	0.016
Virginia	0.140	Rhode Island	0.011
Tennessee	0.134	Vermont	0.010
Kentucky	0.121	District of Columbia	0.007
Oklahoma	0.116		

Table 12: Mexican Point Source Annual Mercury Emissions by SIC Code (tons)

SIC code	SIC code description	Emissions
3341	Secondary Smelting and Refining of Nonferrous Metals	9.667
3339	Primary Smelting and Refining of Nonferrous Metals, Except Copper and Aluminum	8.590
4911	Electric Services	0.834
2812	Alkalies and Chlorine	0.734
2911	Petroleum Refining	0.143
3325	Steel Foundries, NEC	0.055
3331	Primary Smelting and Refining of Copper	0.030

2611	Pulp Mills	0.006
3241	Cement, Hydraulic	0.004
4953	Refuse Systems	0.002
3274	Lime	0.001

Table 13: Mexican Point Source Annual Mercury Emissions by State (tons)

State	Emissions
Zacatecas	9.667
Sonora	4.415
San Luis Potosi	2.242
Coahuila De Zaragoza	0.998
Baja California Norte	0.968
Nuevo Leon	0.833
Durango	0.481
Sinaloa	0.354
Tamaulipas	0.091
Chihuahua	0.016
Baja California Sur	0.001
Jalisco	0.001
Aguascalientes	0.000

Figure 1: Map of Mexican Point Sources North of 21.7ºN

Table 14: Canadian Non-Confidential Point Source Annual Mercury Emissions by First Six Digits of the SCC (tons)

6 digit partial SCC	1st digit SCC description	2nd and 3rd digits SCC description	4th, 5th and 6th digits SCC description	Emissions
303010	Industrial Processes	Primary Metal Production	Lead Production	2.006
303030	Industrial Processes	Primary Metal Production	Zinc Production	1.628
501001	Waste Disposal	Solid Waste Disposal - Government	Municipal Incineration	0.534
501005	Waste Disposal	Solid Waste Disposal - Government	Other Incineration	0.490
101002	External Combustion Boilers	Electric Generation	Bituminous/Subbituminous Coal	0.345
101003	External Combustion Boilers	Electric Generation	Lignite	0.321
303005	Industrial Processes	Primary Metal Production	Primary Copper Smelting	0.287
101006	External Combustion Boilers	Electric Generation	Natural Gas	0.226
502001	Waste Disposal	Solid Waste Disposal - Commercial/Institutional	Incineration	0.211
503900	Waste Disposal	Solid Waste Disposal - Industrial	Auxillary Fuel/No Emissions	0.143

503001	Waste Disposal	Solid Waste Disposal - Industrial	Incineration	0.137
502900	Waste Disposal	Solid Waste Disposal - Commercial/Institutional	Auxillary Fuel/No Emissions	0.134
307001	Industrial Processes	Pulp and Paper and Wood Products	Sulfate (Kraft) Pulping	0.095
306001	Industrial Processes	Petroleum Industry	Process Heaters	0.067
501900	Waste Disposal	Solid Waste Disposal - Government	Auxillary Fuel/No Emissions	0.054
305104	Industrial Processes	Mineral Products	Bulk Materials Unloading Operation	0.052
301008	Industrial Processes	Chemical Manufacturing	Chloro-alkali Production	0.041
101004	External Combustion Boilers	Electric Generation	Residual Oil	0.033
102004	External Combustion Boilers	Industrial	Residual Oil	0.030
305016	Industrial Processes	Mineral Products	Lime Manufacture	0.023
301022	Industrial Processes	Chemical Manufacturing	Sulfuric Acid (Chamber Process)	0.022
304003	Industrial Processes	Secondary Metal Production	Grey Iron Foundries	0.020
403011	Petroleum and Solvent Evaporation	Petroleum Product Storage at Refineries	Floating Roof Tanks (Varying Sizes)	0.012
305010	Industrial Processes	Mineral Products	Coal Mining, Cleaning, and Material Handling (See 305310)	0.011
101005	External Combustion Boilers	Electric Generation	Distillate Oil	0.011
306002	Industrial Processes	Petroleum Industry	Catalytic Cracking Units	0.010
502005	Waste Disposal	Solid Waste Disposal - Commercial/Institutional	Incineration: Special Purpose	0.008
306999	Industrial Processes	Petroleum Industry	Petroleum Products - Not Classified	0.007
102006	External Combustion Boilers	Industrial	Natural Gas	0.006
303009	Industrial Processes	Primary Metal Production	Steel Manufacturing (See 3-03-015 for Integrated Iron & Steel MACT)	0.005
304007	Industrial Processes	Secondary Metal Production	Steel Foundries	0.004
306099	Industrial Processes	Petroleum Industry	Incinerators	0.004
310004	Industrial Processes	Oil and Gas Production	Process Heaters	0.003
503005	Waste Disposal	Solid Waste Disposal - Industrial	Incineration	0.003
310001	Industrial Processes	Oil and Gas Production	Crude Oil Production	0.002
501007	Waste Disposal	Solid Waste Disposal - Government	Sewage Treatment	0.002
103006	External Combustion Boilers	Commercial/Institutional	Natural Gas	0.001
other				0.012

Table 15: Canadian Non-Confidential Point Source Annual Mercury Emissions by Province (tons)

Province	Emissions
British Columbia	2.18
Manitoba	1.98
Nova Scotia	0.53
Quebec	0.51
Alberta	0.49
Saskatchewan	0.39
New Brunswick	0.31

Ontario	0.25
Newfoundland	0.21
Prince Edward Island	0.16

Table 16: Canadian Area and Confidential Point Source Annual Mercury Emissions by SCC (tons)

SCC	1st digit SCC description or 1st and 2nd digits SCC description	2nd and 3rd digit SCC description or 3rd and 4th digits SCC description	4th, 5th and 6th digit SCC description or 5th, 6th and 7th digits SCC description	7th and 8th digit SCC description or 8th, 9th and 10th digits SCC description	Emissions
2303000000	Industrial Processes	Primary Metal Production: SIC 33	All Processes	Total	0.891
2305000000	Industrial Processes	Mineral Processes: SIC 32	All Processes	Total	0.286
2461800000	Solvent Utilization	Miscellaneous Non-industrial: Commercial	Pesticide Application: All Processes	Total: All Solvent Types	0.161
2307000000	Industrial Processes	Wood Products: SIC 24	All Processes	Total	0.102
2325000000	Industrial Processes	Mining and Quarrying: SIC 14	All Processes	Total	0.075
2101002000	Stationary Source Fuel Combustion	Electric Utility	Bituminous/Subbituminous Coal	Total: All Boiler Types	0.064
2104004000	Stationary Source Fuel Combustion	Residential	Distillate Oil	Total: All Combustor Types	0.050
2601000000	Waste Disposal, Treatment, and Recovery	On-site Incineration	All Categories	Total	0.041
2310000000	Industrial Processes	Oil and Gas Production: SIC 13	All Processes	Total: All Processes	0.040
2104006010	Stationary Source Fuel Combustion	Residential	Natural Gas	Residential Furnaces	0.037
2104000000	Stationary Source Fuel Combustion	Residential			0.027
2301000000	Industrial Processes	Chemical Manufacturing: SIC 28	All Processes	Total	0.014
2620000000	Waste Disposal, Treatment, and Recovery	Landfills	All Categories	Total	0.005
2302000000	Industrial Processes	Food and Kindred Products: SIC 20	All Processes	Total	0.002
2104007000	Stationary Source Fuel Combustion	Residential	Liquified Petroleum Gas (LPG)	Total: All Combustor Types	0.002
2399000000	Industrial Processes	Industrial Processes: NEC	Industrial Processes: NEC	Total	0.001
2309000000	Industrial Processes	Fabricated Metals: SIC 34	All Processes	Total	0.001
2104005000	Stationary Source Fuel Combustion	Residential	Residual Oil	Total: All Combustor Types	0.000
2850000030	Miscellaneous Area Sources	Health Services	Hospitals	Pathological Incineration	0.000
2304000000	Industrial Processes	Secondary Metal	All Processes	Total	0.000

		Production: SIC 33			

Table 17: Canadian Area and Confidential Point Source Annual Mercury Emissions by Province (tons)

Province	Emissions
Quebec	1.338
British Columbia	0.283
Alberta	0.223
Nova Scotia	0.123
Manitoba	0.106
Ontario	0.089
New Brunswick	0.071
Saskatchewan	0.061
Newfoundland	0.044
Prince Edward Island	0.004
Nunavut	0.000

Table 18: Canadian Nonroad Source Annual Mercury Emissions by SCC (tons)

SCC	1st and 2nd digits SCC description	3rd and 4th digits SCC description	5th, 6th and 7th digits SCC description	8th, 9th and 10th digits SCC description	Emissions
2270006000	Mobile Sources	Off-highway Vehicle Diesel	Commercial Equipment	Total	0.066
2270005000	Mobile Sources	Off-highway Vehicle Diesel	Agricultural Equipment	Total	0.061
2285002005	Mobile Sources	Railroad Equipment	Diesel	Line Haul Locomotives	0.037
2270003050	Mobile Sources	Off-highway Vehicle Diesel	Industrial Equipment	Other Material Handling Equipment	0.020
2270002000	Mobile Sources	Off-highway Vehicle Diesel	Construction and Mining Equipment	Total	0.013
2260001020	Mobile Sources	Off-highway Vehicle Gasoline, 2-Stroke	Recreational Equipment	Snowmobiles	0.009
2270003000	Mobile Sources	Off-highway Vehicle Diesel	Industrial Equipment	Total	0.007
2270007000	Mobile Sources	Off-highway Vehicle Diesel	Logging Equipment	Total	0.007
2280000000	Mobile Sources	Marine Vessels, Commercial	All Fuels	Total, All Vessel Types	0.007
2260004010	Mobile Sources	Off-highway Vehicle Gasoline, 2-Stroke	Lawn and Garden Equipment	Lawn Mowers (Residential)	0.005
2270000000	Mobile Sources	Off-highway Vehicle Diesel	Compression Ignition Equipment except Rail and Marine	Total	0.005
2265006000	Mobile Sources	Off-highway Vehicle	Commercial Equipment	Total	0.005

		Gasoline, 4-Stroke			
2260005000	Mobile Sources	Off-highway Vehicle Gasoline, 2-Stroke	Agricultural Equipment	Total	0.003
2280003000	Mobile Sources	Marine Vessels, Commercial	Residual	Total, All Vessel Types	0.003
2265000000	Mobile Sources	Off-highway Vehicle Gasoline, 4-Stroke	4-Stroke Gasoline except Rail and Marine	All	0.000
2270006010	Mobile Sources	Off-highway Vehicle Diesel	Commercial Equipment	Pumps	0.000

Table 19: Canadian Nonroad Source Annual Mercury Emissions by Province (tons)

Province	Emissions
Ontario	0.243
Quebec	0.005
Newfoundland	0.000
British Columbia	0.000
New Brunswick	0.000
Nova Scotia	0.000
Alberta	0.000
Prince Edward Island	0.000
Manitoba	0.000

Table 20: Canadian Onroad Source Annual Mercury Emissions by SCC (tons)

SCC	1st and 2nd digits SCC description	3rd and 4th digits SCC description	5th, 6th and 7th digits SCC description	8th, 9th and 10th digits SCC description	Emissions
2230070290	Mobile Sources	Highway Vehicles - Diesel	All HDDV including Buses (use subdivisions -071 thru -075 if possible)	Urban Minor Arterial: Total	0.045
2230070250	Mobile Sources	Highway Vehicles - Diesel	All HDDV including Buses (use subdivisions -071 thru -075 if possible)	Urban Other Freeways and Expressways: Total	0.044
2230070270	Mobile Sources	Highway Vehicles - Diesel	All HDDV including Buses (use subdivisions -071 thru -075 if possible)	Urban Other Principal Arterial: Total	0.039
2201001290	Mobile Sources	Highway Vehicles - Gasoline	Light Duty Gasoline Vehicles (LDGV)	Urban Minor Arterial: Total	0.014
2201060290	Mobile Sources	Highway Vehicles - Gasoline	NOT USED - Previously all LDGT (1&2) under M5	Urban Minor Arterial: Total	0.005
2201001250	Mobile Sources	Highway Vehicles - Gasoline	Light Duty Gasoline Vehicles (LDGV)	Urban Other Freeways and Expressways: Total	0.004
2201001270	Mobile Sources	Highway Vehicles - Gasoline	Light Duty Gasoline Vehicles (LDGV)	Urban Other Principal Arterial: Total	0.004
2201060250	Mobile Sources	Highway Vehicles - Gasoline	NOT USED - Previously all LDGT (1&2) under M5	Urban Other Freeways and Expressways: Total	0.002
2201060270	Mobile Sources	Highway Vehicles - Gasoline	NOT USED - Previously all LDGT	Urban Other Principal Arterial: Total	0.002

			(1&2) under M5		
2230060290	Mobile Sources	Highway Vehicles - Diesel	Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)	Urban Minor Arterial: Total	0.001
2230001290	Mobile Sources	Highway Vehicles - Diesel	Light Duty Diesel Vehicles (LDDV)	Urban Minor Arterial: Total	0.001
2230060250	Mobile Sources	Highway Vehicles - Diesel	Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)	Urban Other Freeways and Expressways: Total	0.000
2230060270	Mobile Sources	Highway Vehicles - Diesel	Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT)	Urban Other Principal Arterial: Total	0.000
2230001250	Mobile Sources	Highway Vehicles - Diesel	Light Duty Diesel Vehicles (LDDV)	Urban Other Freeways and Expressways: Total	0.000
2230001270	Mobile Sources	Highway Vehicles - Diesel	Light Duty Diesel Vehicles (LDDV)	Urban Other Principal Arterial: Total	0.000
2201070290	Mobile Sources	Highway Vehicles - Gasoline	Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)	Urban Minor Arterial: Total	0.000
2201070250	Mobile Sources	Highway Vehicles - Gasoline	Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)	Urban Other Freeways and Expressways: Total	0.000
2201070270	Mobile Sources	Highway Vehicles - Gasoline	Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV)	Urban Other Principal Arterial: Total	0.000
2201080290	Mobile Sources	Highway Vehicles - Gasoline	Motorcycles (MC)	Urban Minor Arterial: Total	0.000
2201080250	Mobile Sources	Highway Vehicles - Gasoline	Motorcycles (MC)	Urban Other Freeways and Expressways: Total	0.000
2201080270	Mobile Sources	Highway Vehicles - Gasoline	Motorcycles (MC)	Urban Other Principal Arterial: Total	0.000

Table 21: Wisconsin Great Lake States Emissions Inventory Area Source Categories

SCC	1st digit SCC description or 1st and 2nd digits SCC description	2nd and 3rd digit SCC description or 3rd and 4th digits SCC description	4th, 5th and 6th digit SCC description or 5th, 6th and 7th digits SCC description	7th and 8th digit SCC description or 8th, 9th and 10th digits SCC description
2101004001	Stationary Source Fuel Combustion	Electric Utility	Distillate Oil	All Boiler Types
2102001000	Stationary Source Fuel Combustion	Industrial	Anthracite Coal	Total: All Boiler Types
2102004000	Stationary Source Fuel Combustion	Industrial	Distillate Oil	Total: Boilers and IC Engines
2102006001	Stationary Source Fuel Combustion	Industrial	Natural Gas	All Boiler Types
2102006002	Stationary Source Fuel Combustion	Industrial	Natural Gas	All IC Engine Types
2102008000	Stationary Source Fuel Combustion	Industrial	Wood	Total: All Boiler Types
2103004000	Stationary Source Fuel Combustion	Commercial/Institutional	Distillate Oil	Total: Boilers and IC Engines
2103006000	Stationary Source Fuel Combustion	Commercial/Institutional	Natural Gas	Total: Boilers and IC Engines
2103008000	Stationary Source Fuel Combustion	Commercial/Institutional	Wood	Total: All Boiler Types
2104001000	Stationary Source Fuel Combustion	Residential	Anthracite Coal	Total: All Combustor Types
2104004000	Stationary Source Fuel Combustion	Residential	Distillate Oil	Total: All Combustor Types
2104006010	Stationary Source Fuel Combustion	Residential	Natural Gas	Residential Furnaces
2104007000	Stationary Source Fuel Combustion	Residential	Liquified Petroleum Gas (LPG)	Total: All Combustor Types
2305000000	Industrial Processes	Mineral Processes: SIC 32	All Processes	Total
2399000000	Industrial Processes	Industrial Processes: NEC	Industrial Processes: NEC	Total

2601010000	Waste Disposal, Treatment, and Recovery	On-site Incineration	Industrial	Total
2601020000	Waste Disposal, Treatment, and Recovery	On-site Incineration	Commercial/Institutional	Total
2620030000	Waste Disposal, Treatment, and Recovery	Landfills	Municipal	Total
2861000000	Miscellaneous Area Sources	Fluorescent Lamp Breakage	Total	Total
31301200	Industrial Processes	Electrical Equipment	Fluorescent Lamp Recycling	Fluorescent Lamp Recycling: Lamp Crusher

Table 22: Minnesota Great Lake States Emissions Inventory Area Source Categories

SCC	1st and 2nd digits SCC description	3rd and 4th digits SCC description	5th, 6th and 7th digits SCC description	8th, 9th and 10th digits SCC description
2104002000	Stationary Source Fuel Combustion	Residential	Bituminous/Subbituminous Coal	Total: All Combustor Types
2104004000	Stationary Source Fuel Combustion	Residential	Distillate Oil	Total: All Combustor Types
2104006000	Stationary Source Fuel Combustion	Residential	Natural Gas	Total: All Combustor Types
2104007000	Stationary Source Fuel Combustion	Residential	Liquified Petroleum Gas (LPG)	Total: All Combustor Types
2601020000	Waste Disposal, Treatment, and Recovery	On-site Incineration	Commercial/Institutional	Total
2620030000	Waste Disposal, Treatment, and Recovery	Landfills	Municipal	Total
2650000001	Waste Disposal, Treatment, and Recovery	Scrap and Waste Materials	Scrap and Waste Materials	Crushing
2861000000	Miscellaneous Area Sources	Fluorescent Lamp Breakage	Total	Total

Table 23: Illinois Great Lake States Emissions Inventory Area Source Categories

SCC	1st digit SCC description or 1st and 2nd digits SCC description	2nd and 3rd digit SCC description or 3rd and 4th digits SCC description	4th, 5th and 6th digit SCC description or 5th, 6th and 7th digits SCC description	7th and 8th digit SCC description or 8th, 9th and 10th digits SCC description
2104002000	Stationary Source Fuel Combustion	Residential	Bituminous/Subbituminous Coal	Total: All Combustor Types
2104004000	Stationary Source Fuel Combustion	Residential	Distillate Oil	Total: All Combustor Types
2104006000	Stationary Source Fuel Combustion	Residential	Natural Gas	Total: All Combustor Types
2104011000	Stationary Source Fuel Combustion	Residential	Kerosene	Total: All Heater Types
2861000000	Miscellaneous Area Sources	Fluorescent Lamp Breakage	Total	Total
31301200	Industrial Processes	Electrical Equipment	Fluorescent Lamp Recycling	Fluorescent Lamp Recycling: Lamp Crusher

Table 24: Michigan Great Lake States Emissions Inventory Area Source Categories

SCC	1st digit SCC description or 1st and 2nd digits SCC description	2nd and 3rd digit SCC description or 3rd and 4th digits SCC description	4th, 5th and 6th digit SCC description or 5th, 6th and 7th digits SCC description	7th and 8th digit SCC description or 8th, 9th and 10th digits SCC description
2810060100	Miscellaneous Area Sources	Other Combustion	?????	?????
2861000000	Miscellaneous Area Sources	Fluorescent Lamp Breakage	Total	Total
31301200	Industrial Processes	Electrical Equipment	Fluorescent Lamp Recycling	Fluorescent Lamp Recycling: Lamp Crusher

Table 25: U.S. Mercury and Mercury Compounds Pollutant Codes

Pollutant code	Pollutant name
199	Mercury & Compounds
200	Mercury (Elemental Gaseous)
201	Mercury (Gaseous Divalent)
202	Mercury (Particulate Divalent)
22967926	Mercury (Organic)
593748	Methyl Mercury
62384	Mercury Acetato Phen
7439976	Mercury
7487947	Mercuric Chloride

Table 26: U.S. Reported Point Source Mercury Distributions

Mean	r	Mean + (3 * r)	Mean - (3 * r)	Pollutant code	Pollutant name
0.0016	0.0313	0.0954	-0.0922	199, 7439976 & 22967926	mercury & compounds, mercury and mercury (organic)
0.0357	0.0540	0.1977	-0.1264	200, 201 & 202	mercury (elemental gaseous), mercury (gaseous divalent) & mercury (particulate divalent)
0.0025	0.0468	0.1429	-0.1380	199	mercury & compounds
0.0193	0.0333	0.1191	-0.0805	200	mercury (elemental gaseous),
0.0153	0.0293	0.1031	-0.0726	201	mercury (gaseous divalent)
0.0011	0.0025	0.0086	-0.0063	202	mercury (particulate divalent)
0.0011	0.0163	0.0499	-0.0477	7439976	mercury

Table 27: Mexican Point Source Group Descriptions

Point Source Group Description
Carboelectric plants
Carbon black plants
Cement plants
Chloro-alkali plants
Coke manufacturing
Copper smelters
Ferrous smelters
Gold mining and refining

Hazardous waste incinerators
Lime plants
Medical waste incinerators
Mercury mining/refining
Oil refineries
Primary lead and zinc smelters
Pulp and paper plants
Thermoelectric plants